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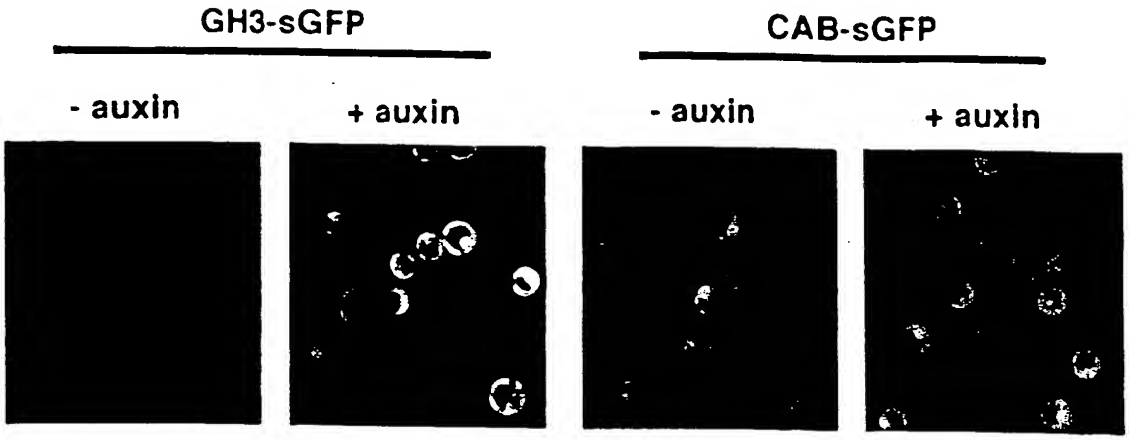
FIG. 1

a


GH3-sGFP
CAB-sGFP
- auxin
+ auxin
- auxin
+ auxin

b

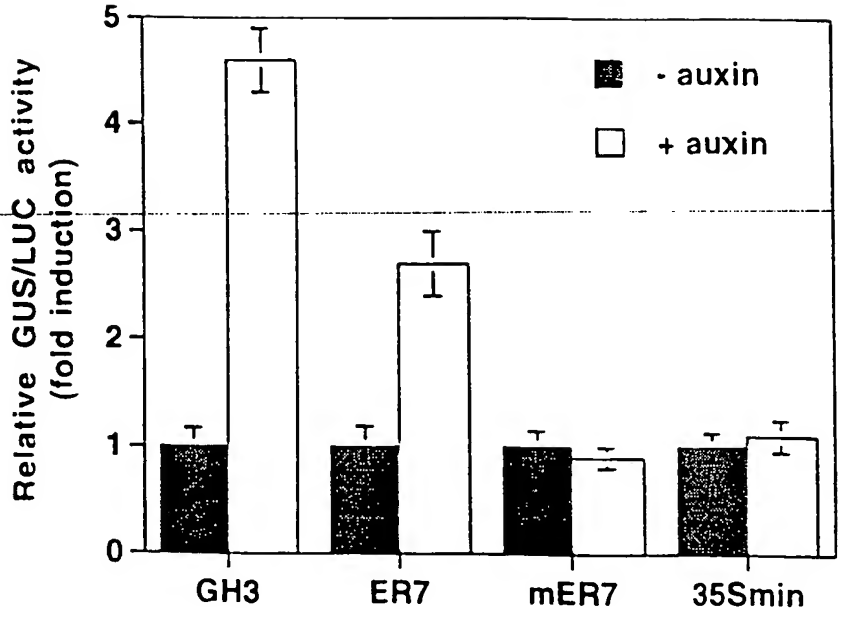
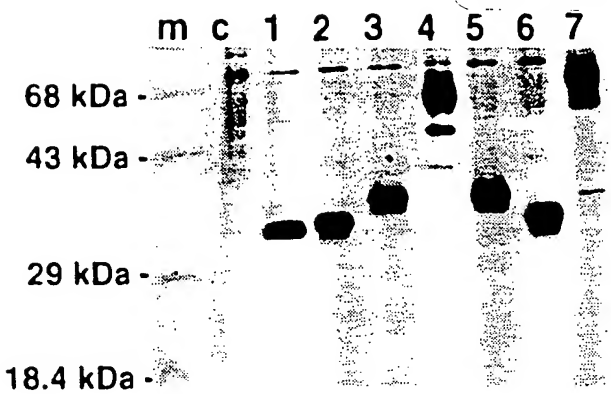

Relative GUS/LUC activity
(fold induction)
5
4
3
2
1
0
- auxin
+ auxin
GH3
ER7
mER7
35Smin

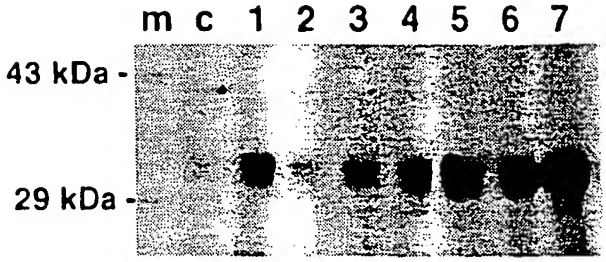
Fig. 2

a



m - marker
c - control
1 - NPK1
2 - NPK1mut
3 - CTR1
4 - CDPK
5 - APK2
6 - ASK1
7 - CK1-1

b



c

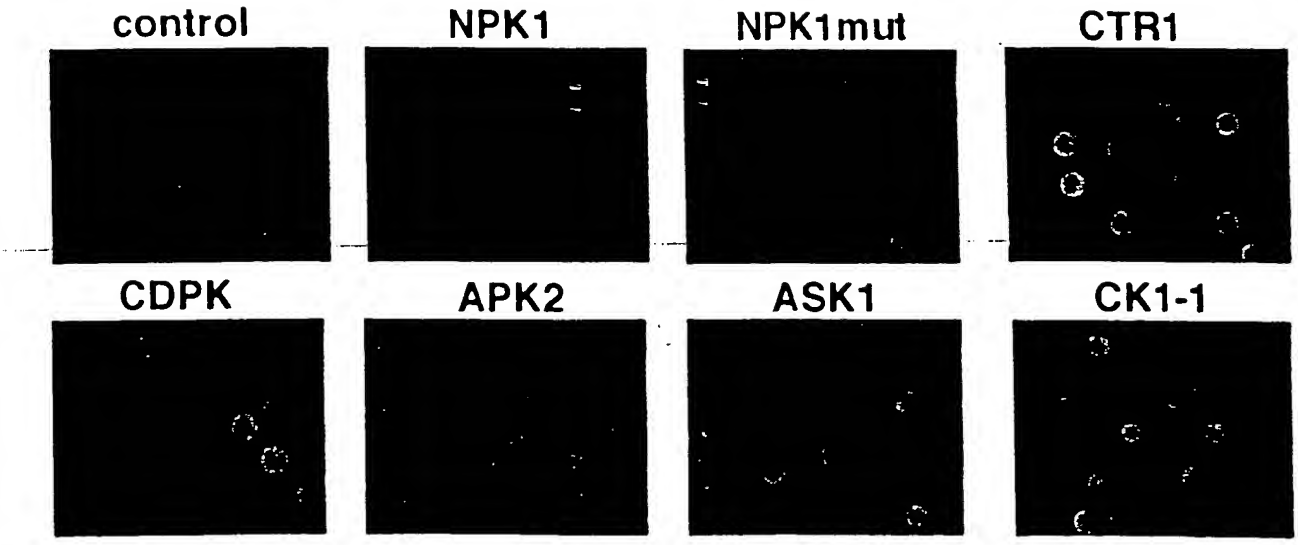
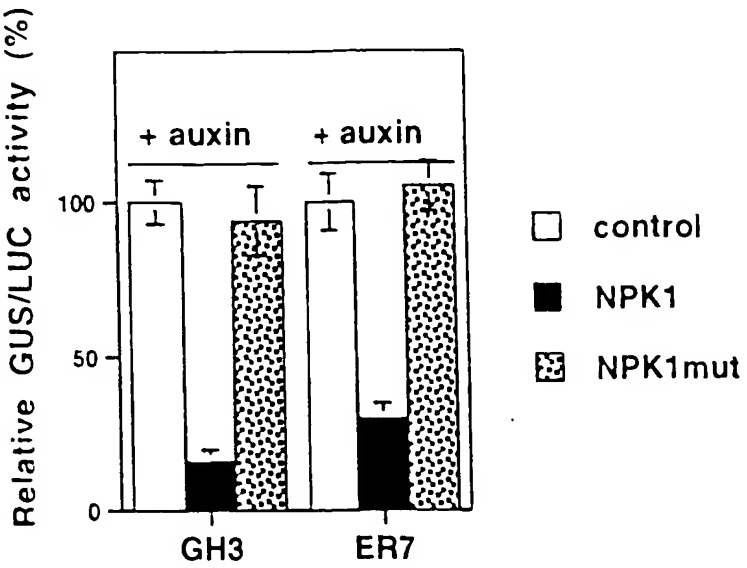
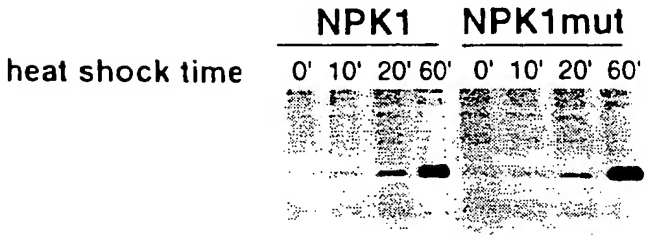


FIG. 2

d


Relative GUS/LUC activity (%)
+ auxin
+ auxin
100
50
0
GH3
ER7
control
NPK1
NPK1mut

e


NPK1
NPK1mut
heat shock time
0' 10' 20' 60' 0' 10' 20' 60'

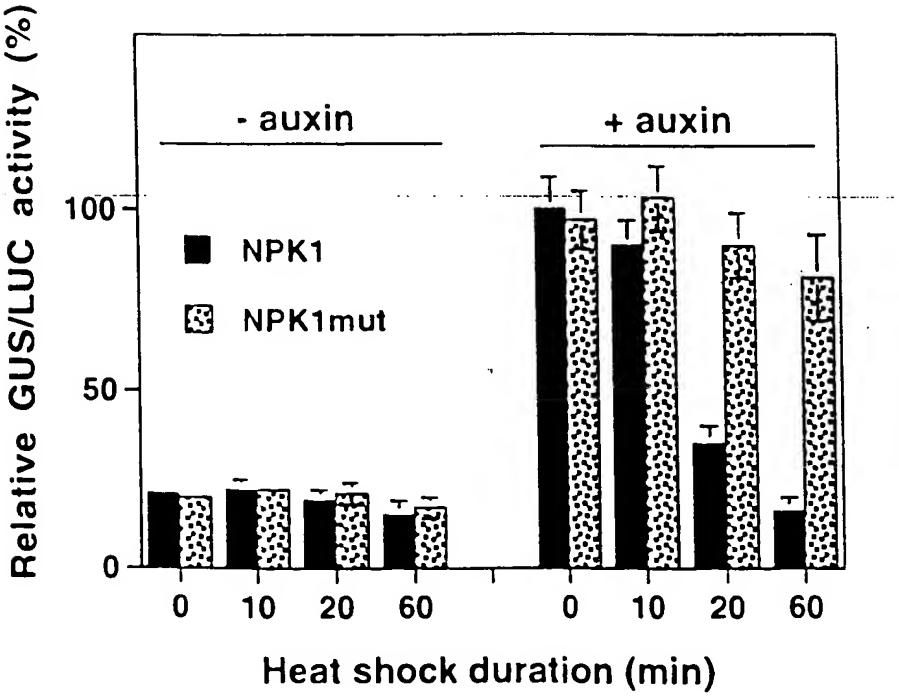
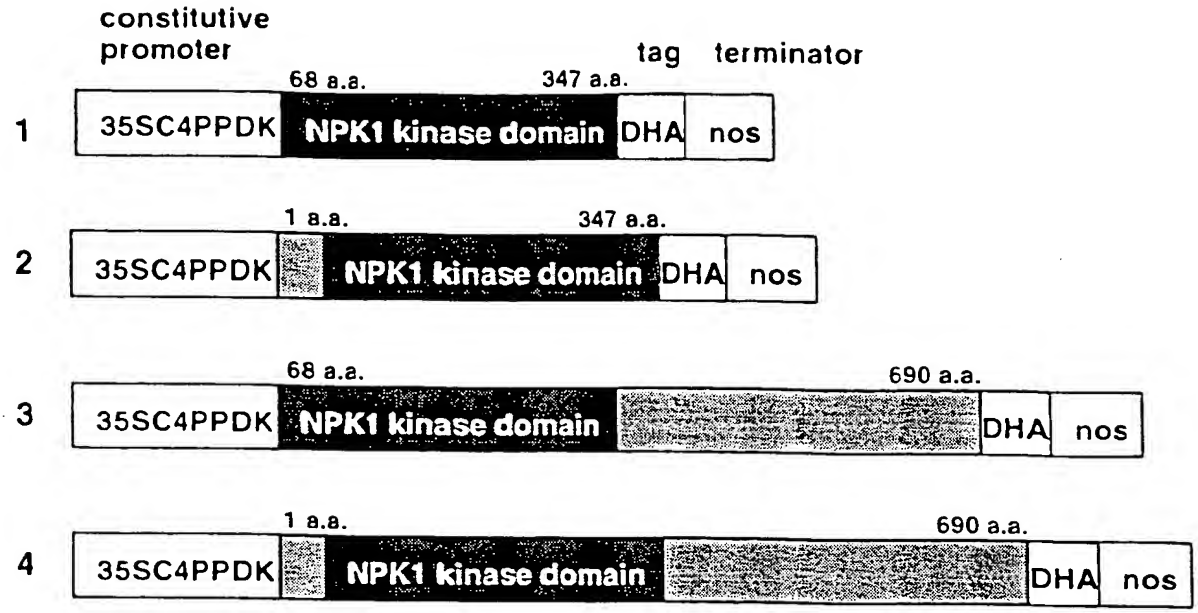
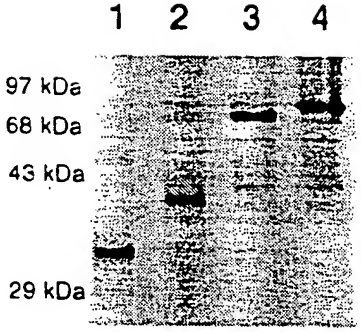

Relative GUS/LUC activity (%)
- auxin
+ auxin
100
50
0
NPK1
NPK1mut
0 10 20 60 0 10 20 60
Heat shock duration (min)

FIG. 3

a


constitutive promoter
tag
terminator
68 a.a.
347 a.a.
1
35SC4PPDK
NPK1 kinase domain
DHA
nos
1 a.a.
347 a.a.
2
35SC4PPDK
NPK1 kinase domain
DHA
nos
68 a.a.
690 a.a.
3
35SC4PPDK
NPK1 kinase domain
DHA
nos
1 a.a.
690 a.a.
4
35SC4PPDK
NPK1 kinase domain
DHA
nos

b


1 2 3 4
97 kDa
68 kDa
43 kDa
29 kDa

c

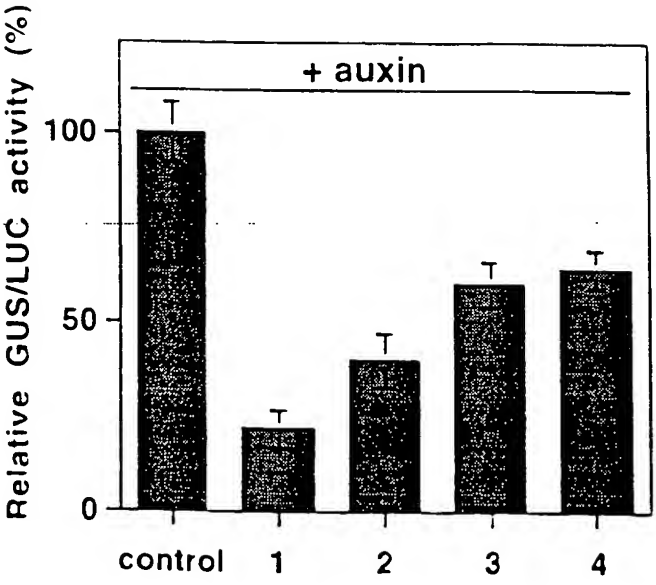
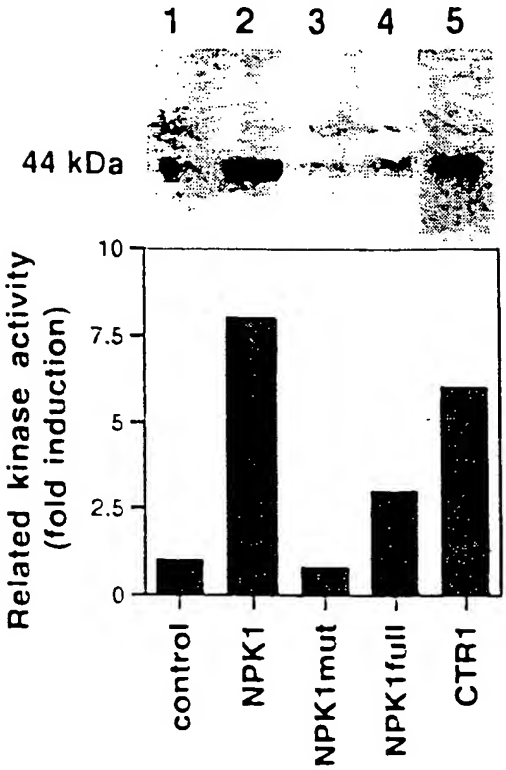

+ auxin
Relative GUS/LUC activity (%)
100
50
0
control
1
2
3
4

FIG. 4

a


1
2
3
4
5
44 kDa
Related kinase activity (fold induction)
10
7.5
5
2.5
0
control
NPK1
NPK1mut
NPK1full
CTR1

b

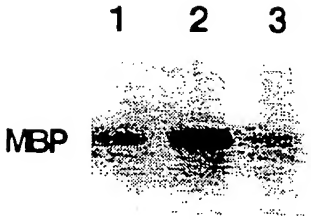
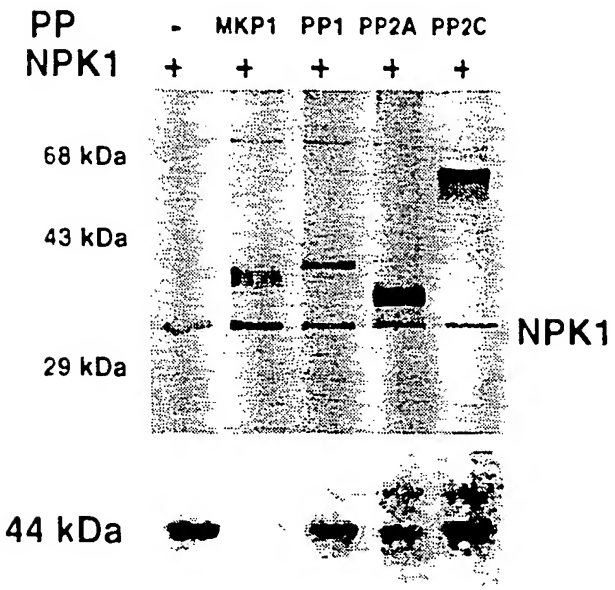

1
2
3
MBP

FIG. 4

c


PP - MKP1 PP1 PP2A PP2C
NPK1 + + + + +
68 kDa
43 kDa
29 kDa
NPK1
44 kDa

d

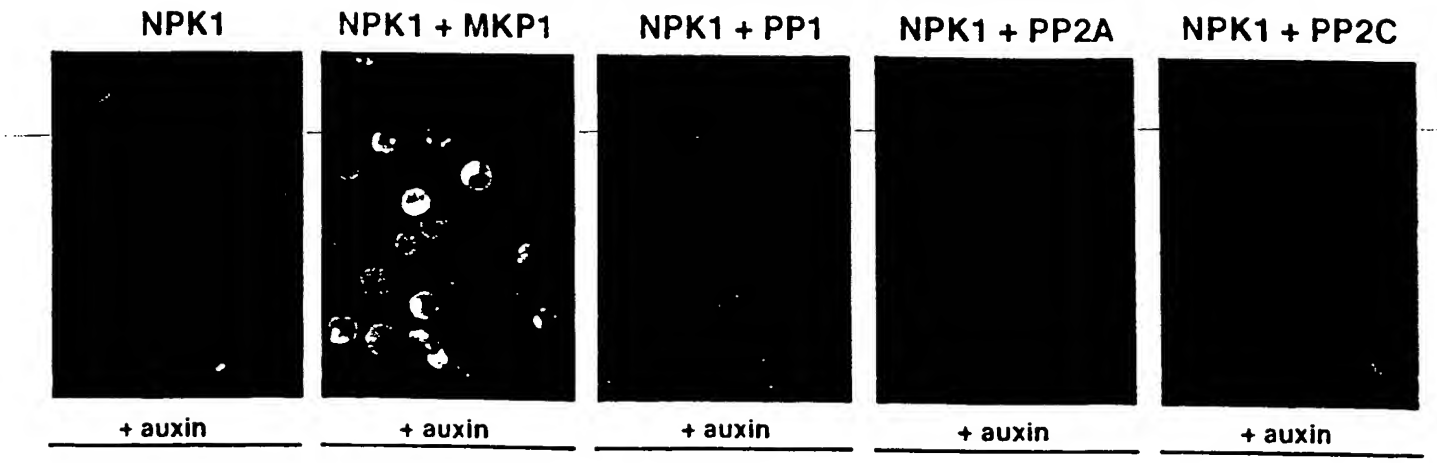

NPK1
NPK1 + MKP1
NPK1 + PP1
NPK1 + PP2A
NPK1 + PP2C
+ auxin
+ auxin
+ auxin
+ auxin
+ auxin

Fig. 5

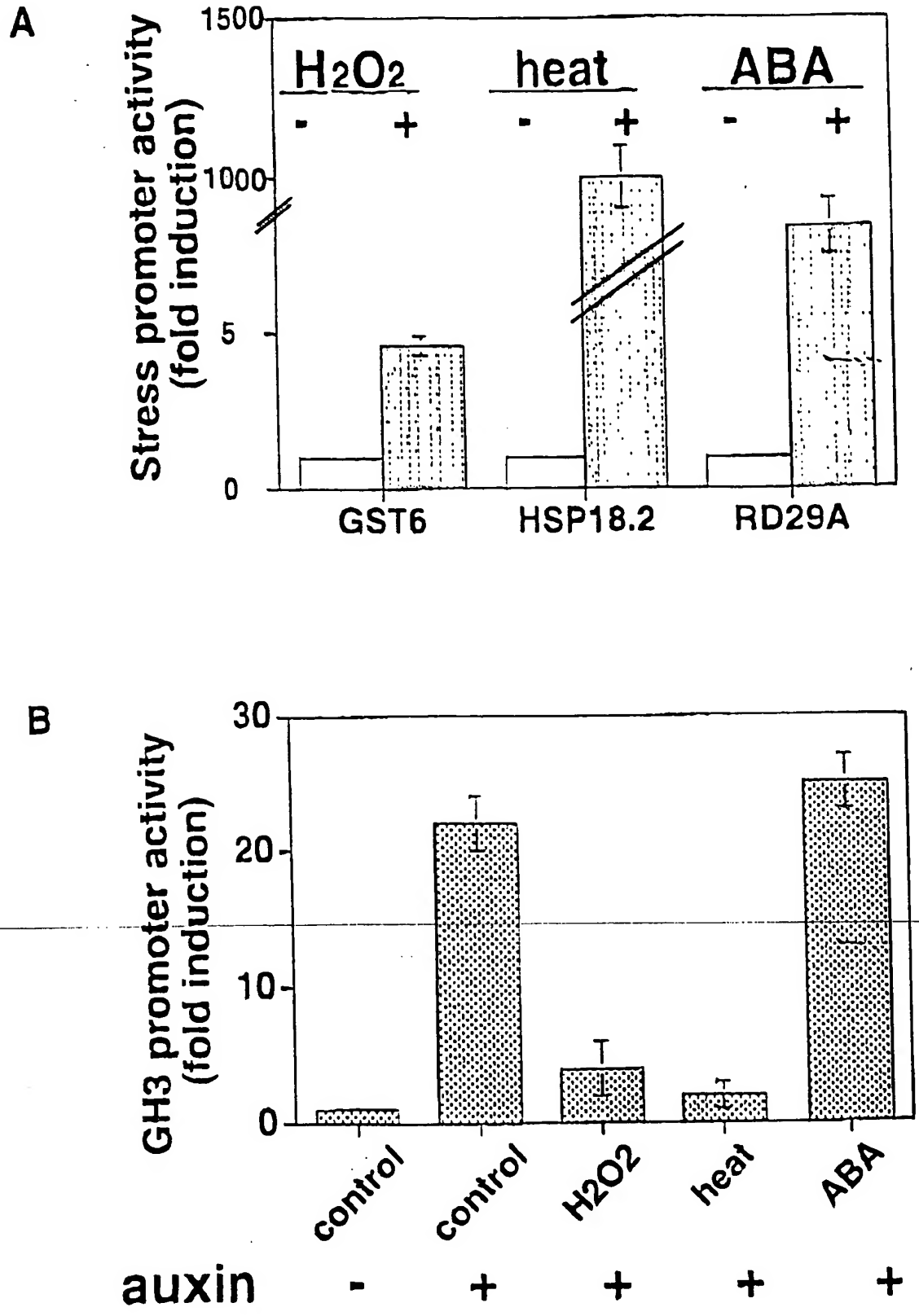

A
Stress promoter activity (fold induction)
1500
1000
5
0
H2O2
heat
ABA
-
+
-
+
-
+
GST6
HSP18.2
RD29A
B
GH3 promoter activity (fold induction)
30
20
10
0
control
control
H2O2
heat
ABA
auxin
-
+
+
+
+

Fig. 6

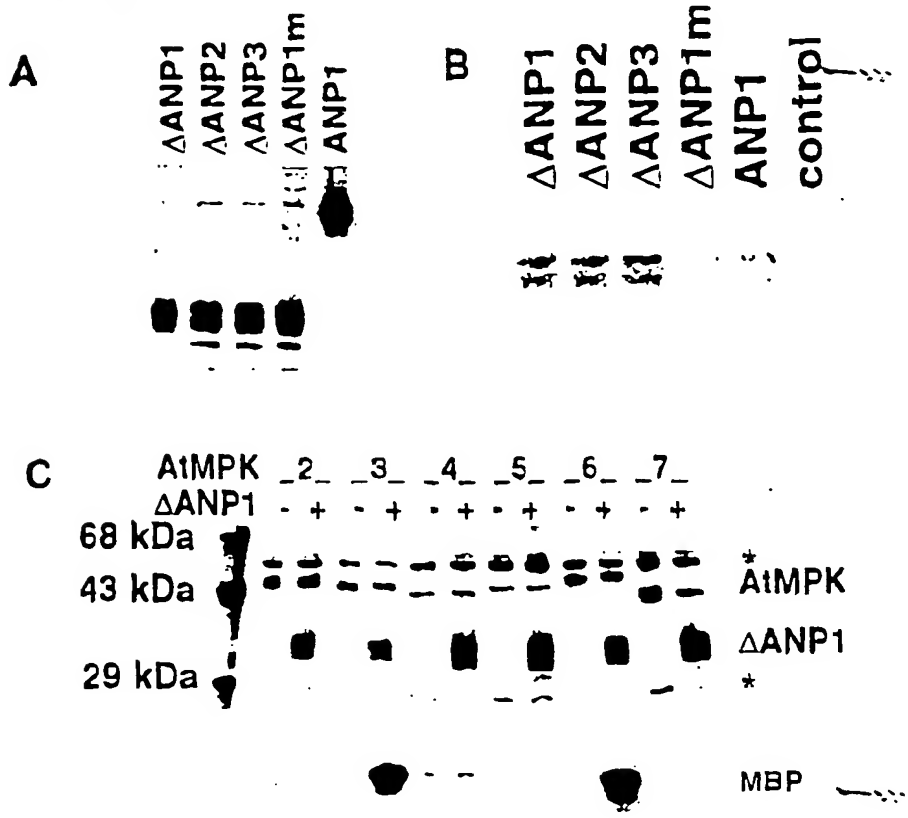

A
ΔANP1
ΔANP2
ΔANP3
ΔANP1m
ANP1
B
ΔANP1
ΔANP2
ΔANP3
ΔANP1m
ANP1
control
C
AtMPK _2_ _3_ _4_ _5_ _6_ _7_
ΔANP1 - + - + - + - + - + - +
68 kDa
43 kDa
29 kDa
*
AtMPK
ΔANP1
*
MBP
D
control
H2O2
heat
cold
auxin
ABA
control
H2O2
heat
cold
auxin
ABA
control
MBP
AtMPK3
AtMPK3+ANP1
AtMPK3
+ΔANP1

FIGURE 7A

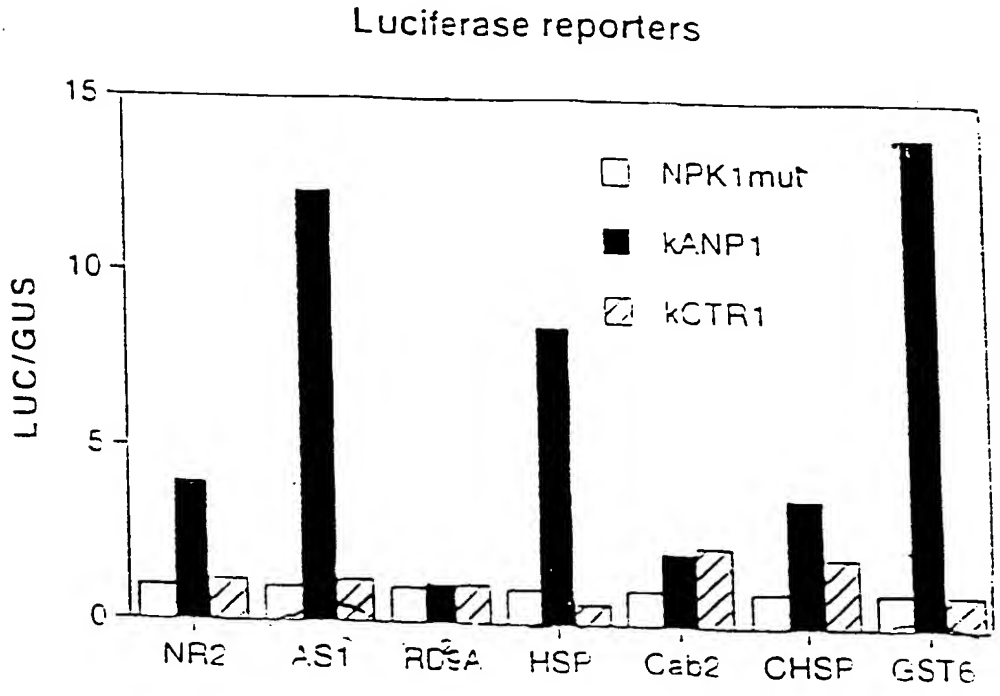
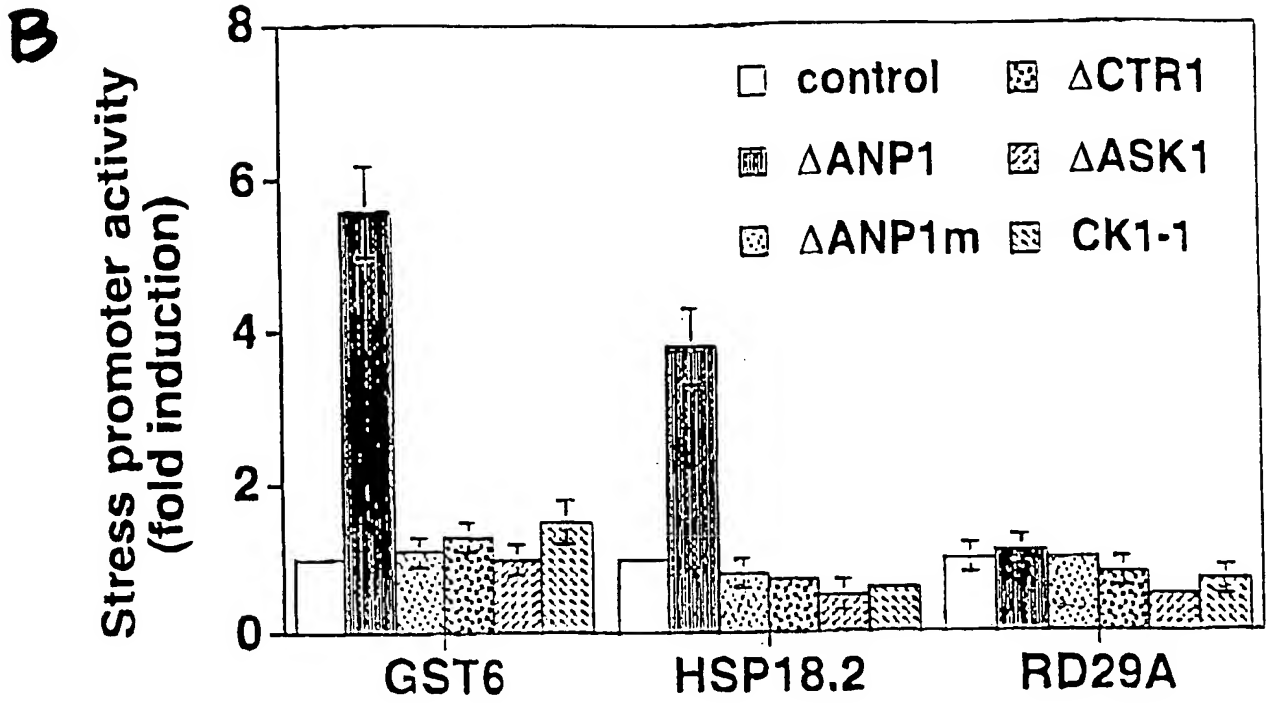

Luciferase reporters
LUC/GUS
15
10
5
0
NPK1mut
kANP1
kCTR1
NR2
AS1
RD29A
HSP
Cab2
CHSP
GST6

Fig. 4


B
Stress promoter activity (fold induction)
8
6
4
2
0
control
ΔCTR1
ΔANP1
ΔASK1
ΔANP1m
CK1-1
GST6
HSP18.2
RD29A

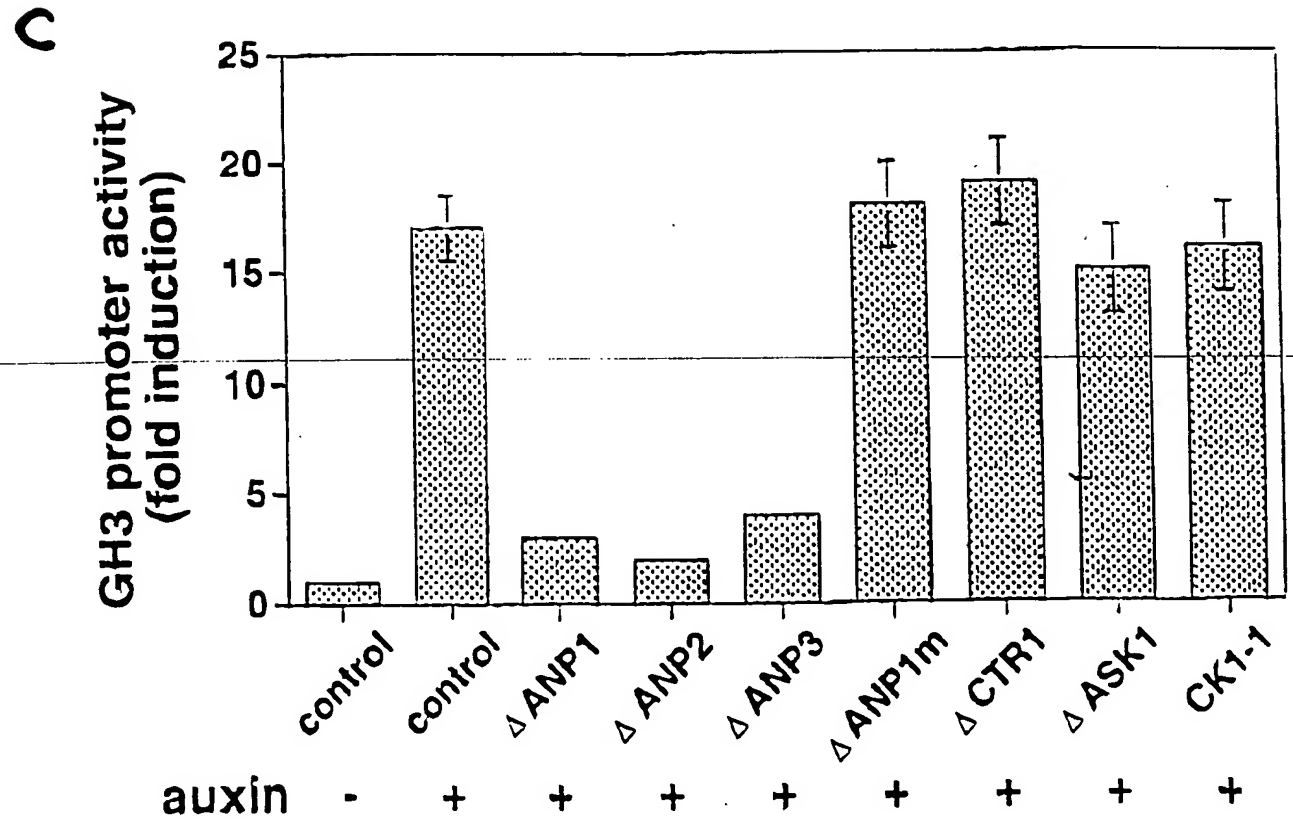
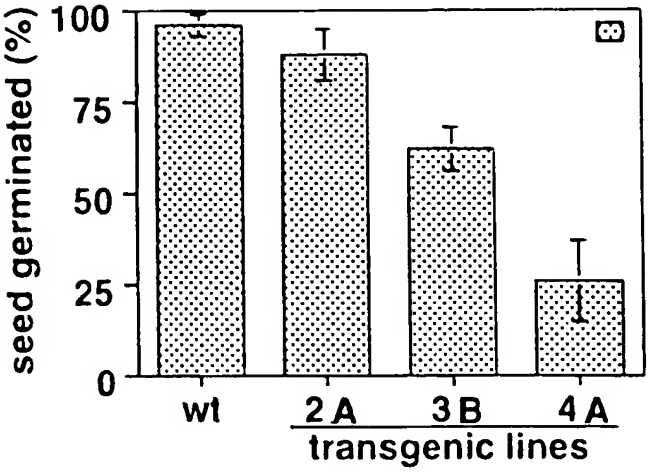

C
GH3 promoter activity (fold induction)
25
20
15
10
5
0
control
control
ΔANP1
ΔANP2
ΔANP3
ΔANP1m
ΔCTR1
ΔASK1
CK1-1
auxin - + + + + + + + +

Fig. 8

a


seed germinated (%)
100
75
50
25
0
wt
2 A
3 B
4 A
transgenic lines

b

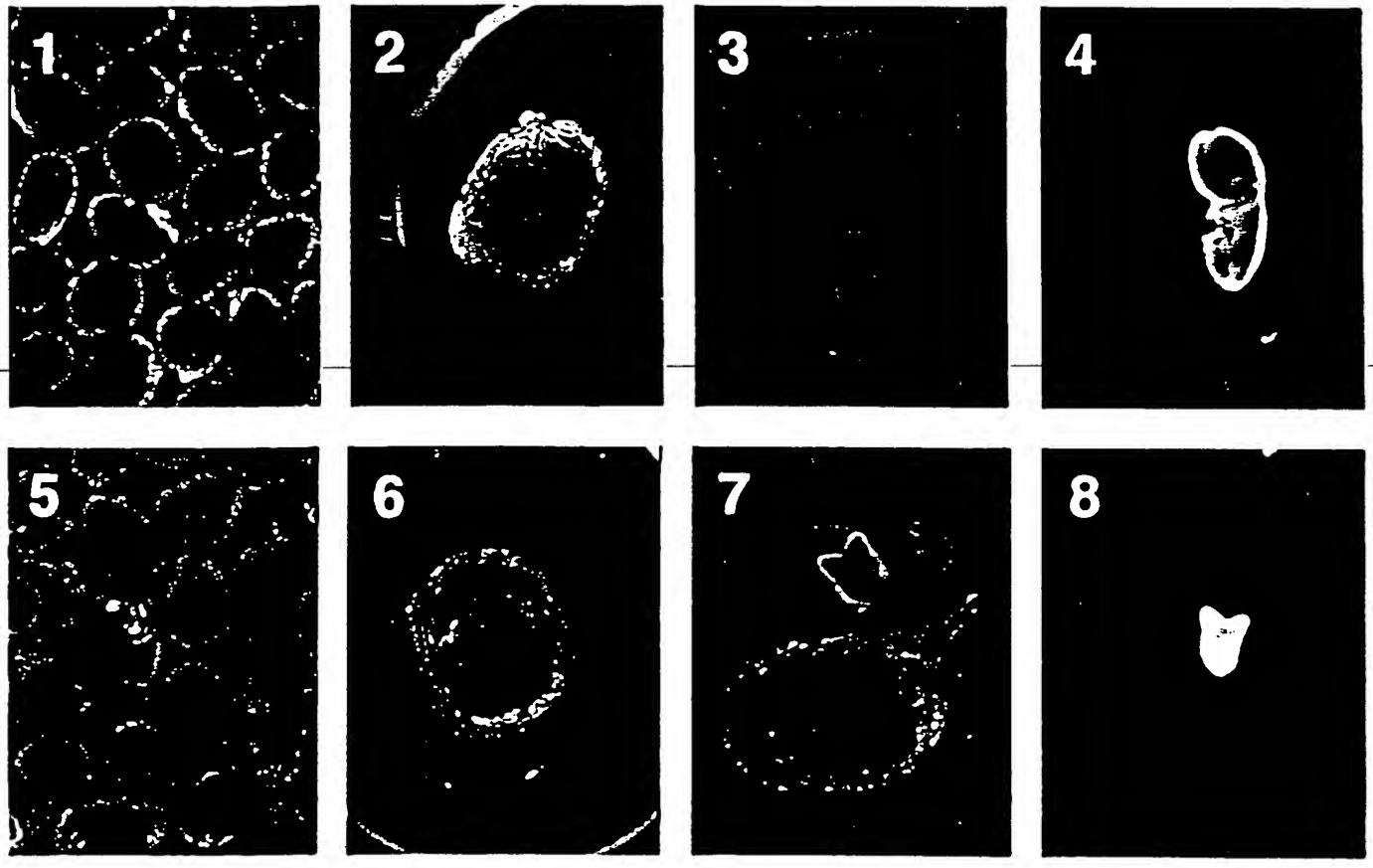
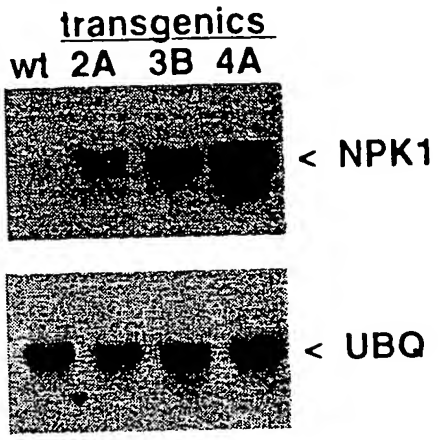

1
2
3
4
5
6
7
8

Fig. 8

c


transgenics
wt 2A 3B 4A
< NPK1
< UBQ

d

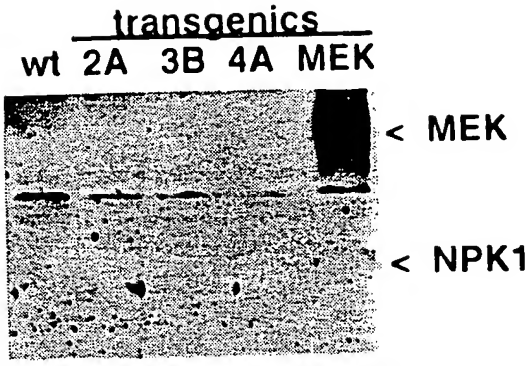

transgenics
wt 2A 3B 4A MEK
< MEK
< NPK1

FIGURE 9

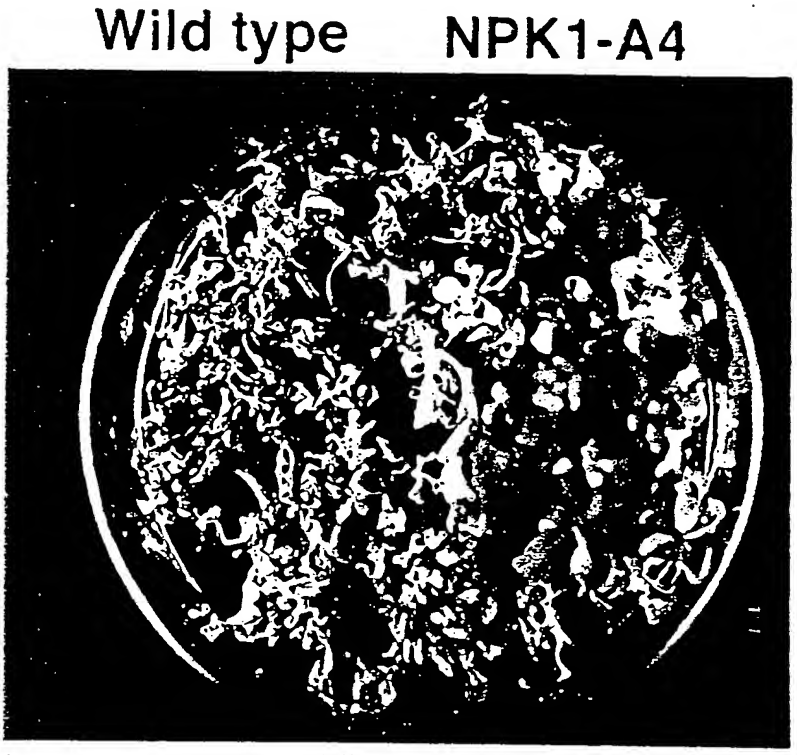
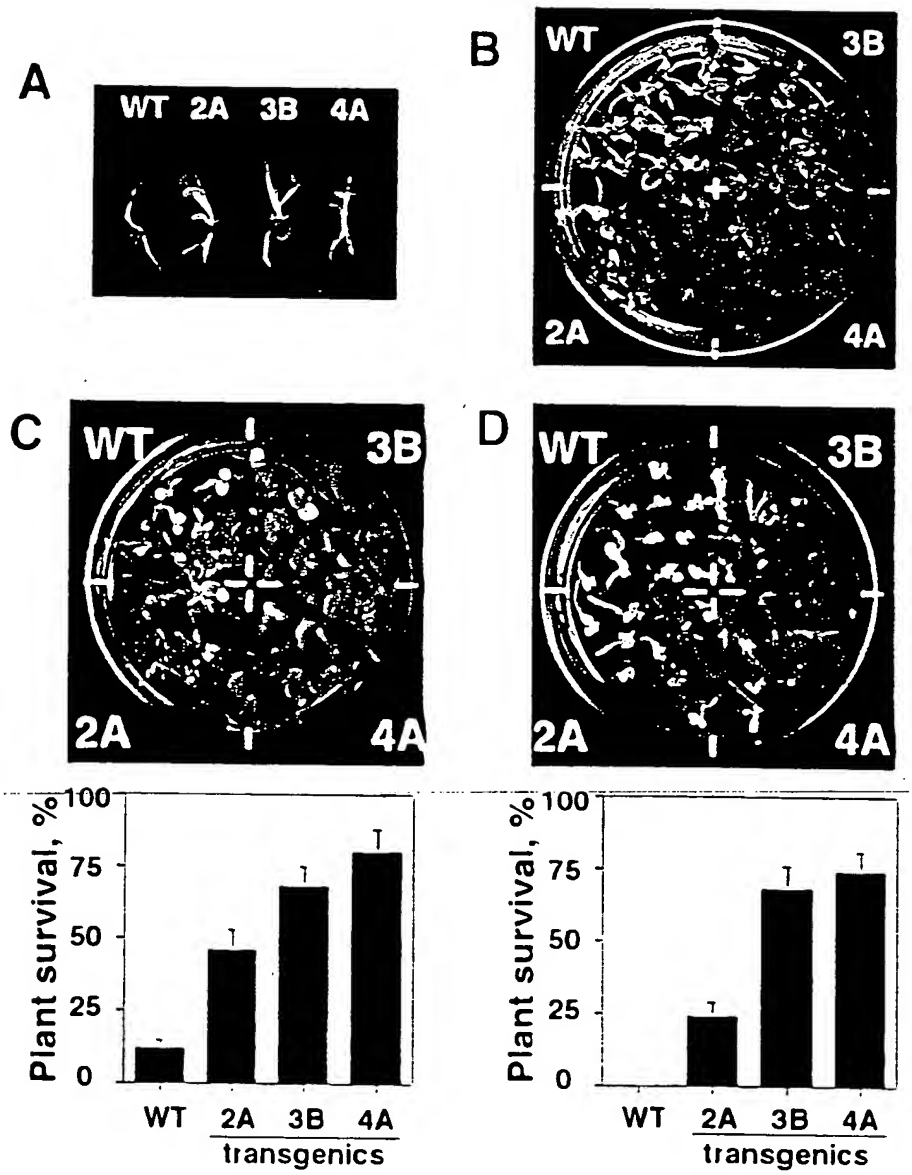


FIGURE 10


A
WT 2A 3B 4A
B
WT
3B
2A
4A
C
WT
3B
2A
4A
D
WT
3B
2A
4A
Plant survival, %
100
75
50
25
0
WT 2A 3B 4A
transgenics
Plant survival, %
100
75
50
25
0
WT 2A 3B 4A
transgenics

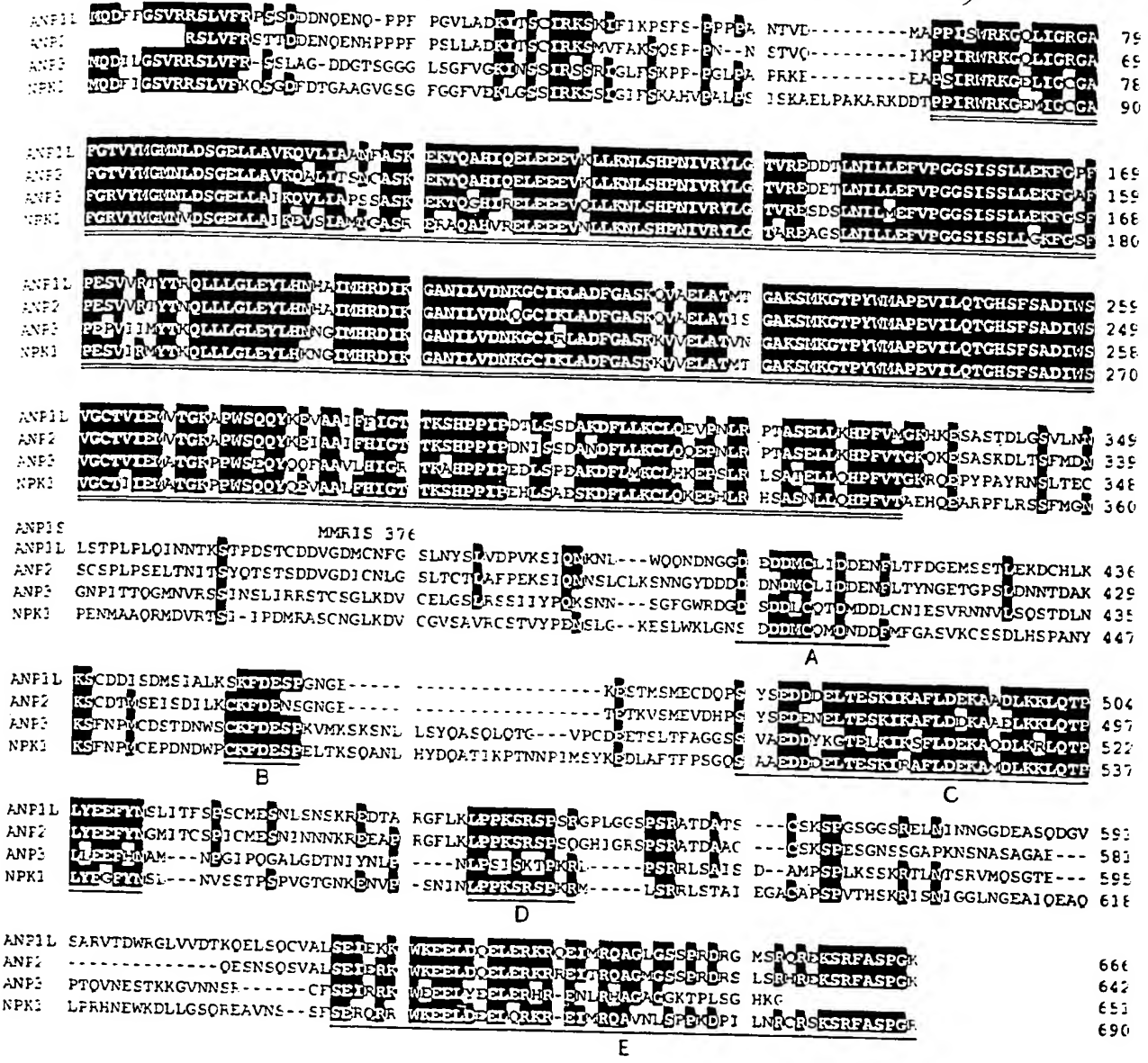


FIGURE 11

FIGURE 12

ANP1
Amino Acid Sequence

GSVRRSLVFRPSSDDDNQENQPPFPGVLADKITSCIRKSKIFIK
PSFSPPPPANTVDMAPPISWRKGQLIGRGAFGTVYMGMNLDSGELLAVKQVLIAANFA
SKEKTQAHIQELEEEVKLLKNLSHPNIVRYLGTVREDDTLNILLEFVPGGSISSLLEK
FGPFPESVVRTYTRQLLLGLEYLHNHAIMHRDIKGANILVDNKGCIKLADFGASKQVA
ELATMTGAKSMKGTPYWMAPEVILQTGHSFSADIWSVGCTVIEMVTGKAPWSQQYKEV
AAIFFIGTTKSHPPIPDTLSSDAKDFLLKCLQEVPNLRPTASELLKHPFVMGKHKESA
STDLGSVLNNLSTPLPLQINNTKSTPDSTCDDVGDMCNFGSLNYSLVDPVKSIQNKNL
WQQNDNGGDEDDMCLIDDENFLTFDGEMSSTLEKDCHLKKSCDDISDMSIALKSKFDE
SPGNGEKESTMSMECDQPSYSEDDDELTESKIKAFLDEKAADLKKLQTPLYEEFYNSL
ITFSPSCMESNLSNSKREDTARGFLKLPPKSRSPSRGPLGGSPSRATDATSCSKSPGS
GGSRELNINNGGDEASQDGVSARVTDWRGLVVDTKQELSQCVALSEIEKKWKEELDQE
LERKRQEIMRQAGLGSSPRDRGMSRQREKSRFASPGK

ANP1
Nucleotide Sequence

```
   1 cggctccgtt cgtcgatcgc ttgttttccg tccttcttcc gacgacgata accaggagaa
  61 ccagcctccg tttcccggtg ttctcgccga taagatcacc tcttgcatcc gcaaatcgaa
 121 gatttttatc aaaccctcct tctcgcctcc tcctcctgct aacactgtag acatggcacc
 181 tccgatttcg tggaggaaag gtcagttaat tggtcgcggc gcgtttggta cggtgtacat
 241 gggtatgaat cttgactccg gggagcttct cgccgtcaaa caggttctga ttgcagccaa
 301 ttttgcttcc aaggaaaaga ctcaggctca tattcaggag cttgaagaag aagttaagct
 361 tcttaaaaat ctctcccatc ctaatatagt tagatatttg ggtacagtga gggaagatga
 421 taccctgaat atccttctcg agtttgttcc cggtggatcg atatcatcgc tcttggagaa
 481 atttggacct tttcctgaat cagttgtccg gacatacaca aggcaactgc ttttagggtt
 541 ggagtacctg cacaatcatg caattatgca cagagacatt aaggggcta atatccttgt
 601 ggataataaa ggatgcatta agcttgctga ttttggtgca tccaaacaag tagctgagtt
 661 ggctacgatg actggtgcaa aatctatgaa agggacacca tattggatgg ctccggaagt
 721 tatccttcaa actggacata gcttctctgc tgacatatgg agcgtcggct gtacagttat
 781 tgaaatggtg actgggaagg ctccttggag tcagcagtat aaagaggttg ctgctatctt
 841 cttcatagga acaacaaaat cacatcctcc aatacctgat actctctcct ctgatgcaaa
 901 agatttctg ctcaagtgtc tgcaggaggt accaaatctg cggccaaccg catctgagct
 961 actaaagcat ccttttgtta tggggaaaca caaggagtct gcttctactg atcttggttc
1021 tgtcctgaac aatcttagca ctccactacc gttacagata ataacacca agagcactcc
1081 agattctact tgcgacgatg taggtgacat gtgtaacttt ggcagtttga attattcact
1141 tgtagatcct gtgaaatcaa tccaaaacaa aaatttatgg caacaaaatg ataatggagg
1201 tgatgaagac gatatgtgtt tgatagatga tgagaatttc ttgacatttg acggagaaat
1261 gagttctacc cttgaaaaag attgtcatct gaagaagagc tgtgatgaca taagtgatat
1321 gtccattgct ttgaagtcca aatttgacga aagtcctggt aatggagaga aagagtctac
1381 aatgagcatg gaatgtgacc aaccttcata ctcagaggat gatgatgagc tgaccgagtc
1441 aaaaattaaa gctttcttag atgagaaggc tgcagatcta aagaagttac agactcctct
1501 ctatgaagaa ttctacaata gtttgatcac attctctccc agttgtatgg agagtaattt
1561 aagtaacagt aaaagagagg acactgctcg tggtttcctg aaactgcctc caaaaagcag
```

FIGURE 12

```
1621 gtcaccgagt cggggccctc ttggtggttc accttcaaga gcaacagacg caactagttg
1681 ttccaagagc ccaggaagtg gaggtagtcg tgaattgaat attaacaatg gaggtgatga
1741 agcttcacag gatggtgtat cagcacgggt cacagactgg aggggcctcg ttgttgacac
1801 taagcaggaa ttaagccagt gtgttgcttt gtcagacata gagaagaagt ggaaggaaga
1861 gcttgatcaa gaactggaaa gaaagcgaca agaaatcatg cgccaagcag ggttgggatc
1921 atccccaaga gacagaggca tgagccgaca gagagagaag tcgaggtttg catcaccagg
1981 aaaatgactt gcacaaaaag tctccggctt tttgattttt gattgctcaa ctagtatata
2041 tatctgtaac tcttatctcg ctgtgatgaa aagtagacac gaggtttggt ctgaatatat
2101 gattctgaac tggttgttga aggtattaga tgtgtgtaat gtgagtgtcg ggtgc
```

FIGURE 13

ANP2
Amino Acid Sequence

RSLVFRSTTDDENQENHPPPFPSLLADKITSCIRKSMVFAKSQS
PPNNSTVQIKPPIRWRKGQLIGRGAFGTVYMGMNLDSGELLAVKQALITSNCASKEKT
QAHIQELEEEVKLLKNLSHPNIVRYLGTVREDETLNILLEFVPGGSISSLLEKFGAFP
ESVVRTYTNQLLLGLEYLHNHAIMHRDIKGANILVDNQGCIKLADFGASKQVAELATI
SGAKSMKGTPYWMAPEVILQTGHSFSADIWSVGCTVIEMVTGKAPWSQQYKEIAAIFH
IGTTKSHPPIPDNISSDANDFLLKCLQQEPNLRPTASELLKHPFVTGKQKESASKDLT
SFMDNSCSPLPSELTNITSYQTSTSDDVGDICNLGSLTCTLAFPEKSIQNNSLCLKSN
NGYDDDDDNDMCLIDDENFLTYNGETGPSLDNNTDAKKSCDTMSEISDILKCKFDENS
GNGETETKVSMEVDHPSYSEDENELTESKIKAFLDDKAAELKKLQTPLYEEFYNGMIT
CSPICMESNINNNKREEAPRGFLKLPPKSRSPSQGHIGRSPSRATDAACCSKSPESGN
SSGAPKNSNASAGAEQESNSQSVALSEIERKWKEELDQELERKRREITRQAGMGSSPR
DRSLSRHREKSRFASPGK

ANP2
Nucleotide Sequence

```
   1 cgctcacttg tcttccgttc taccaccgac gatgagaatc aagagaatca tcctcctccg
  61 tttccttctc tcctcgccga taaaatcact tcctgtatcc gcaaatcaat ggttttcgcc
 121 aaatcccagt cacctccgaa taactccacc gtacaaatca aacctccgat tcggtggcgc
 181 aaaggtcagt taattggccg tggcgctttt ggtactgtgt atatgggtat gaatctcgat
 241 tccggtgagc ttctcgccgt taaacaggct ctgattacat ctaattgtgc atccaaggaa
 301 aaaactcagg ctcatattca ggagcttgaa gaggaagtga agctactcaa gaatctctct
 361 catccaaata tagttagata tttgggtacg gtgagggaag atgaaacttt gaatatcttg
 421 cttgaatttg ttcctggtgg atctatatct tcactcttgg agaaatttgg agcctttcct
 481 gaatctgttg ttcggacata cacgaaccaa ctgcttttgg gattggagta ccttcataat
 541 catgccatta tgcaccgtga cattaagggt gctaatatcc ttgtggataa tcaaggatgc
 601 attaaacttg ctgattttgg tgcgtccaaa caggtagcgg agttggctac tatttcgggt
 661 gccaaatcta tgaaaggaac tccctattgg atggctccag aagttattct tcaaaccggg
 721 catagctttt ctgctgatat ttggagtgta ggatgcacag tgattgaaat ggtgactgga
 781 aaagctcctt ggagccagca atataaagag attgctgcta ttttccacat tggaacgacg
 841 aaatcgcatc ctccaatccc tgacaatatc tcctctgacg caaatgattt tttgctcaag
 901 tgtctgcagc aggaaccaaa tctgcggcca accgcttctg agctgctaaa gcatccattt
 961 gttacgggca aacagaagga atctgcgtct aaagatctta cttcatttat ggacaattca
1021 tgcagtcctt taccatcaga gttgactaac attacgagct atcaaacatc tacgagtgac
1081 gatgtaggag acatctgtaa cttgggtagt ctgacttgta cacttgcttt ccctgagaaa
1141 tcaatccaaa ataacagttt gtgtctgaaa agtaataacg ggtatgatga cgatgatgat
1201 aatgatatgt gtttgattga cgatgagaat ttcttgacat ataatggaga gactggccct
1261 agtcttgaca ataatactga tgccaagaag agctgtgata ccatgagtga gatctctgat
1321 attttgaagt gcaaatttga cgaaaattct ggaaacggag aaacagagac gaaagttagt
1381 atggaagttg accatccatc atactcggag gatgaaaatg agctgactga gtcgaaaatc
1441 aaagctttct tagatgacaa ggctgcagag ttaaagaagt tacagacgcc tctgtacgaa
1501 gaattctaca acggtatgat cacatgctcc cccatctgca tggagagtaa catcaataac
1561 aataaacgag aggaggcacc tcgtggtttc ttgaaactgc ctccaaaaag tcggtctccg
```

FIGURE 13

```
1621 agtcagggcc atattggtcg atcaccttct agagcaacag atgcagcctg ttgttccaag
1681 agtccagaaa gtggtaatag ctctggtgcc ccgaagaata gcaatgcaag tgctggtgct
1741 gaacaagaat caaacagtca aagtgtcgcg ctgtcggaga tagaggaggaa gtggaaggaa
1801 gagcttgatc aagaacttga aagaaagcga agagagatta cacggcaagc agggatggga
1861 tcatccccga gagatagaag cttgagccga catagagaga agtcaagatt tgcatctcca
1921 ggcaaatgat ctgtacaaaa gaaaagcagc caattttgca cttttgtctg taaggcttgt
1981 attgcttttg atctttcgat ttgctcatct agtatatatg atatagacat aaaattgtgc
2041 caacttaaag tttgaatata tatagatagc taaactattt gcttaagtag ggtgtgatgt
2101 gagaatgttg gtgcatattg agtgttaagc caaccacaga acaaatattt tcgagaaatt
2161 atcgaaagct ttgtttactt tcggtccggt ccg
```

FIGURE 14

ANP3
Amino Acid Sequence

MQDILGSVRRSLVFRSSLAGDDGTSGGGLSGFVGKINSSIRSSR
IGLFSKPPPGLPAPRKEEAPSIRWRKGELIGCGAFGRVYMGMNLDSGELLAIKQVLIA
PSSASKEKTQGHIRELEEEVQLLKNLSHPNIVRYLGTVRESDSLNILMEFVPGGSISS
LLEKFGSFPEPVIIMYTKQLLLGLEYLHNNGIMHRDIKGANILVDNKGCIRLADFGAS
KKVVELATVNGAKSMKGTPYWMAPEVILQTGHSFSADIWSVGCTVIEMATGKPPWSEQ
YQQFAAVLHIGRTKAHPPIPEDLSPEAKDFLMKCLHKEPSLRLSATELLQHPFVTGKR
QEPYPAYRNSLTECGNPITTQGMNVRSSINSLIRRSTCSGLKDVCELGSLRSSIIYPQ
KSNNSGFGWRDGDSDDLCQTDMDDLCNIESVRNNVLSQSTDLNKSFNPMCDSTDNWSC
KFDESPKVMKSKSNLLSYQASQLQTGVPCDEETSLTFAGGSSVAEDDYKGTELKIKSF
LDEKAQDLKRLQTPLLEEFHNAMNPGIPQGALGDTNIYNLPNLPSISKTPKRLPSRRL
SAISDAMPSPLKSSKRTLNTSRVMQSGTEPTQVNESTKKGVNNSRCFSEIRRKWEEEL
YEELERHRENLRHAGAGGKTPLSGHKG

ANP3
Nucleotide Sequence

```
   1 tcttcactga tctctctaca cattcaccgt cggcttctca aatgcaggat attctcggat
  61 cggttcgccg atccttggtt ttccggtcgt ctttggccgg agacgatggt actagcggcg
 121 gaggtcttag cggattcgtc gggaagatta actctagtat ccgtagctct cgaattgggc
 181 tcttttctaa gccgcctcca gggcttcctg ctcctagaaa agaagaagcg ccgtcgattc
 241 ggtggaggaa aggggaatta atcggttgcg gtgcttttgg aagagtttac atgggaatga
 301 acctcgattc cggcgagctt cttgcaatta aacaggtttt aatcgctcca agcagtgctt
 361 caaaggagaa gactcagggt cacatccgag agcttgagga agaagtacaa cttcttaaga
 421 atctttcaca tccgaacatc gttagatact tgggtactgt aagagagagt gattcgttga
 481 atattttgat ggagtttgtt cctggtggat caatatcatc tttgttggag aagtttggat
 541 cttttcctga gcctgtgatt attatgtaca caaagcaact tctgcttggg ctggaatatc
 601 ttcacaacaa tgggatcatg catcgagata ttaagggggc aaatattttg gtcgataaca
 661 aaggttgcat cagactcgca gattttggtg cttccaagaa agttgtagag ctagctactg
 721 taaatggtgc caaatctatg aaggggacgc cttattggat ggctcctgaa gtcattctcc
 781 agactggtca tagcttctct gctgatatat ggagtgttgg gtgcactgtg attgagatgg
 841 ctacggggaa gcctccctgg agcgagcagt atcagcagtt tgctgctgtc cttcatattg
 901 gtagaacaaa agctcatcct ccaattccag aagacctctc accagaggct aaagactttc
 961 taatgaaatg cttacacaaa gaaccaagct tgagactctc tgcaaccgaa ttgcttcagc
1021 acccgtttgt cactggaaag cgccaggaac cttatccagc ttaccgtaat tctcttacgg
1081 aatgtggaaa cccaataact actcaaggaa tgaatgttcg gagttcaata aattcgttga
1141 tcaggaggtc gacatgttca ggcttgaagg atgtctgtga actgggaagc ttgaggagtt
1201 ccattatata cccacagaag tcaaataact caggatttgg ttggcgagat ggagactctg
1261 atgacctttg tcagaccgat atggatgatc tctgcaacat tgaatcagtc agaaacaatg
1321 ttttgtcaca gtccaccgat ttaaacaaga gttttaatcc catgtgtgat tccacggata
1381 actggtcttg caagtttgat gaaagcccaa aagtgatgaa aagcaaatct aacctgcttt
1441 cttaccaagc ttctcaactc caaactggag ttccatgtga tgaggaaacc agcttaacat
1501 ttgctggtgg ctcttccgtt gcagaggatg attataaagg cacagagttg aaaataaaat
1561 catttttgga tgagaaggct caggatttga aaaggttgca gacccctctg cttgaagaat
1621 tccacaatgc tatgaatcca ggaatacccc aaggtgcact tggagacacc aatatctaca
```

FIGURE 14

```
1681 atttaccaaa cttaccaagt ataagcaaga cacctaaacg acttccgagt agacgactct
1741 cagcaatcag tgatgctatg cccagcccac tcaaaagctc caaacgtaca ctgaacacaa
1801 gcagagtgat gcagtcagga actgaaccaa ctcaagtcaa cgagtcgacc aagaagggag
1861 taaataatag ccgttgtttc tcagagatac gtcggaagtg ggaagaagaa ctctatgaag
1921 agcttgagag gcatcgagag aatctgcgac acgctggtgc aggagggaag actccattat
1981 caggccacaa aggatagtga acggctaaag agaaactgta tgtttctttc ttatgtttca
2041 aaattacttc ttcgtatttt tttttgttgg tggggtaatt tcatgagcta gtatgatata
2101 tgtagatagt tcttcaacgg ttacatagta ttattattta ttattaattt aattgcc
```

FIGURE 15

NPK1
Amino Acid Sequence

MQDFIGSVRRSLVFKQSGDFDTGAAGVGSGFGGFVEKLGSSIRK
SSIGIFSKAHVPALPSISKAELPAKARKDDTPPIRWRKGEMIGCGAFGRVYMGMNVDS
GELLAIKEVSIAMNGASRERAQAHVRELEEEVNLLKNLSHPNIVRYLGTAREAGSLNI
LLEFVPGGSISSLLGKFGSFPESVIRMYTKQLLLGLEYLHKNGIMHRDIKGANILVDN
KGCIKLADFGASKKVVELATMTGAKSMKGTPYWMAPEVILQTGHSFSADIWSVGCTII
EMATGKPPWSQQYQEVAALFHIGTTKSHPPIPEHLSAESKDFLLKCLQKEPHLRHSAS
NLLQHPFVTAEHQEARPFLRSSFMGNPENMAAQRMDVRTSIIPDMRASCNGLKDVCGV
SAVRCSTVYPENSLGKESLWKLGNSDDDMCQMDNDDFMFGASVKCSSDLHSPANYKSF
NPMCEPDNDWPCKFDESPELTKSQANLHYDQATIKPTNNPIMSYKEDLAFTFPSGQSA
AEDDDELTESKIRAFLDEKAMDLKKLQTPLYEGFYNSLNVSSTPSPVGTGNKENVPSN
INLPPKSRSPKRMLSRRLSTAIEGACAPSPVTHSKRISNIGGLNGEAIQEAQLPRHNE
WKDLLGSQREAVNSSFSERQRRWKEELDEELQRKREIMRQAVNLSPPKDPILNRCRSK
SRFASPGR

NPK1
Nucleotide Sequence

```
   1 ctgaacccta acgcacacaa cttcactctt tgctcctcca aatctctctc caatgcagga
  61 tttcatcggc tccgttcgcc gatctctggt tttcaagcag tccggagact tcgataccgc
 121 cgctgccggt gtcggcagcg gattcggagg cttcgttgag aaactaggtt cgagcattcc
 181 caaatcgagt attggaatct tctcgaaagc tcatgttcct gctcttccgt ctatttctaa
 241 agctgagctg cccgccaagg ctcggaaaga tgacactccg ccaatccggt ggaggaaagg
 301 tgaaatgatt ggatgtggtg cttttggtag ggtttatatg gggatgaatg ttgattctgg
 361 agagttactc gctataaagg aggtttcgat tgcgatgaat ggtgcttcga gagagcgagc
 421 acaagctcat gttagagagc ttgaggaaga agtgaatcta ttgaagaatc tctcccatcc
 481 caacatagtg agatatttgg gaactgcaag agaggcagga tcattaaata tattgttgga
 541 atttgttcct ggtggctcaa tctcgtcact tttgggaaaa tttggatcct tccctgaatc
 601 tgttataaga atgtacacca agcaattgtt attagggttg gaatacttgc ataagaatgg
 661 gattatgcac agagatatta agggagcaaa catacttgtt gacaataaag gttgcattaa
 721 acttgctgat ttcggtgcat ccaagaaggt tgttgaattg gctactatga ctggtgccaa
 781 gtcaatgaag ggtactccat actggatggc tcccgaagtc attctgcaga ctggccatag
 841 cttctctgct gacatatgga gtgtcggatg cactattatc gaaatggcta caggaaaacc
 901 tccttggagc cagcagtatc aggaggttgc tgctctcttc catatagga caaccaaatc
 961 ccatcccccc atcccagagc atctttctgc tgaatcaaag gacttcctat taaaatgttt
1021 gcagaaggaa ccgcacctga ggcattctgc atcaaatttg cttcagcatc catttgttac
1081 agcagaacat caggaagctc gccctttttct tcgctcatcc tttatgggaa accccgaaaa
1141 catggcggcg caaaggatgg atgttaggac ctcaatcatt cctgatatga gagcttcctg
1201 caatggtttg aaagatgttt gtggtgttag cgctgtgagg tgctccactg tatatcccga
1261 gaattcctta gggaaagagt cactctggaa actaggaaac tctgatgatg acatgtgcca
1321 gatggataat gatgatttta tgtttggtgc atctgtgaaa tgcagttcag atttgcattc
1381 tcctgctaat tataagagtt ttaatcctat gtgtgaacct gataacgatt ggccatgcaa
```

FIGURE 15

```
1441 atttgatgaa agtcccgagt tgacgaaaag tcaagcaaac ctgcattatg atcaagcaac
1501 tattaagccc actaataacc ccatcatgtc atacaaggag gatcttgctt tcacatttcc
1561 aagtgggcaa tctgcagccg aggatgatga tgaattgaca gagtctaaaa ttagggcatt
1621 ccttgatgaa aaggcaatgg acttgaagaa gctgcaaaca ccactatatg aaggattcta
1681 caattccttg aatgtttcca gcacaccgag tcccgttggc actgggaaca aggaaaatgt
1741 tccaagtaac ataaacttac caccaaaaag caggtcacca aaacgtatgc ttagcagaag
1801 gctctctact gccattgaag gtgcttgtgc tcccagccca gtgactcatt ccaagcgaat
1861 atcaaatatt ggtggcctaa atggtgaagc tattcaggaa gctcagttgc cgaggcataa
1921 tgaatggaaa gatcttcttg gttctcaacg tgaagcagtt aattcaagct tctctgagag
1981 gcaaagaagg tggaaagaag agcttgatga agagttgcaa aggaaacgag agattatgcg
2041 tcaggcagtc aacttatcac caccaaaggа tccaattcta aatcgatgta gaagtaaatc
2101 aaggtttgca tctcctggaa gataaatgta tgtacttgtg tccctaaact aaagtcagtt
2161 tgaagaatat aattaatgat cctgcaaccc cagaacagag agttagatgt cttgagcagg
2221 tatacgaacg tgaggttttc ttgacccgtt actacaggaa tatcagcgct tgtcagatag
2281 agtgagctgt tactacagga atatctgtca acctgttaat catattataa aatgccaata
2341 atttgcgttg tattcgtttt gatcattctc ctgagagcat tgtaagaaaa atgcaggcct
2401 ttttataacc tatataagtg ctctctcatg gtagttgcca atattaaaac gcagagaaaa
2461 gtcgagttct catctgctga attgtttgta aaatgtgata tattaatgta tttaccgtct
2521 tacaacc
```

FIGURE 16

Kinase Domains (Amino Acid Sequence)

ANP1

PPISWRKGQLIGRGAFGTVYMGMNLDSGELLAVKQVLIAANFASKEKTQAHIQELEEEVKLLKNLSHPNIVRYLGTVR
EDDTLNILLEFVPGGSISSLLEKFGPFPESVVRTYTRQLLLGLEYLHNHAIMHRDIKGANILVDNKGCIKLADFGASK
QVAELATMTGAKSMKGTPYWMAPEVILQTGHSFSADIWSVGCTVIEMVTGKAPWSQQYKEVAAIFFIGTTKSHPPIPD
TLSSDAKDFLLKCLQEVPNLRPTASELLKHPFVM

ANP2

PPIRWRKGQLIGRGAFGTVYMGMNLDSGELLAVKQALITSNCASKEKTQAHIQELEEEVKLLKNLSHPNIVRYLGTVR
EDETLNILLEFVPGGSISSLLEKFGAFPESVVRTYTNQLLLGLEYLHNHAIMHRDIKGANILVDNQGCIKLADFGASK
QVAELATISGAKSMKGTPYWMAPEVILQTGHSFSADIWSVGCTVIEMVTGKAPWSQQYKEIAAIFHIGTTKSHPPIPD
NISSDANDFLLKCLQQEPNLRPTASELLKHPFVT

ANP3

PSIRWRKGELIGCGAFGRVYMGMNLDSGELLAIKQVLIAPSSASKEKTQGHIRELEEEVQLLKNLSHPNIVRYLGTVR
ESDSLNILMEFVPGGSISSLLEKFGSFPEPVIIMYTKQLLLGLEYLHNNGIMHRDIKGANILVDNKGCIRLADFGASK
KVVELATVNGAKSMKGTPYWMAPEVILQTGHSFSADIWSVGCTVIEMATGKPPWSEQYQQFAAVLHIGRTKAHPPIPE
DLSPEAKDFLMKCLHKEPSLRLSATELLQHPFVT

NPK1

PPIRWRKGEMIGCGAFGRVYMGMNVDSGELLAIKEVSIAMNGASRERAQAHVRELEEEVNLLKNLSHPNIVRYLGTAR
EAGSLNILLEFVPGGSISSLLGKFGSFPESVIRMYTKQLLLGLEYLHKNGIMHRDIKGANILVDNKGCIKLADFGASK
KVVELATMTGAKSMKGTPYWMAPEVILQTGHSFSADIWSVGCTIIEMATGKPPWSQQYQEVAALFHIGTTKSHPPIPE
HLSAESKDFLLKCLQKEPHLRHSASNLLQHPFVT

Kinase Domains (Nucleotide Sequence)

ANP1

cc
181 tccgatttcg tggaggaaag gtcagttaat tggtcgcggc gcgtttggta cggtgtacat
241 gggtatgaat cttgactccg gggagcttct cgccgtcaaa caggttctga ttgcagccaa
301 ttttgcttcc aaggaaaaga ctcaggctca tattcaggag cttgaagaag aagttaagct
361 tcttaaaaat ctctcccatc ctaatatagt tagatatttg ggtacagtga gggaagatga
421 taccctgaat atccttctcg agtttgttcc cggtggatcg atatcatcgc tcttggagaa
481 atttggacct tttcctgaat cagttgtccg gacatacaca aggcaactgc ttttagggtt
541 ggagtacctg cacaatcatg caattatgca cagagacatt aaggggggcta atatccttgt
601 ggataataaa ggatgcatta agcttgctga ttttggtgca tccaaacaag tagctgagtt
661 ggctacgatg actggtgcaa aatctatgaa agggacacca tattggatgg ctccggaagt
721 tatccttcaa actggacata gcttctctgc tgacatatgg agcgtcggct gtacagttat
781 tgaaatggtg actgggaagg ctccttggag tcagcagtat aaagaggttg ctgctatctt
841 cttcatagga acaacaaaat cacatcctcc aatacctgat actctctcct ctgatgcaaa
901 agattttctg ctcaagtgtc tgcaggaggt accaaatctg cggccaaccg catctgagct

FIGURE 16

961 actaaagcat ccttttgtta tg

ANP2

cctccgat tcggtggcgg
181 aaaggtcagt taattggccg tggcgctttt ggtactgtgt atatgggtat gaatctcgat
241 tccggtgagc ttctcgccgt taaacaggct ctgattacat ctaattgtgc atccaaggaa
301 aaaactcagg ctcatattca ggagcttgaa gaggaagtga agctactcaa gaatctctct
361 catccaaata tagttagata tttgggtacg gtgagggaag atgaaacttt gaatatcttg
421 cttgaatttg ttcctggtgg atctatatct tcactcttgg agaaatttgg agcctttcct
481 gaatctgttg ttcggacata cacgaaccaa ctgcttttgg gattggagta ccttcataat
541 catgccatta tgcaccgtga cattaagggt gctaatatcc ttgtggataa tcaaggatgc
601 attaaacttg ctgattttgc tgcgtccaaa caggtagcgg agttggctac tatttcgggt
661 gccaaatcta tgaaaggaac tccctattgg atggctccag aagttattct tcaaaccggg
721 catagctttt ctgctgatat ttggagtgta ggatgcacag tgattgaaat ggtgactgga
781 aaagctcctt ggagccagca atataaagag attgctgcta ttttccacat tggaacgacg
841 aaatcgcatc ctccaatccc tgacaatatc tcctctgacg caaatgattt tttgctcaag
901 tgtctgcagc aggaaccaaa tctgcggcca accgcttctg agctgctaaa gcatccattt
961 gttacg

ANP3

ccgtcgattc
241 ggtggaggaa aggggaatta atcggttgcg gtgcttttgg aagagtttac atgggaatga
301 acctcgattc cggcgagctt cttgcaatta aacaggtttt aatcgctcca agcagtgctt
361 caaaggagaa gactcagggt cacatccgag agcttgagga agaagtacaa cttcttaaga
421 atctttcaca tccgaacatc gttagatact tgggtactgt aagagagagt gattcgttga
481 atattttgat ggagtttgtt cctggtggat caatatcatc tttgttggag aagtttggat
541 cttttcctga gcctgtgatt attatgtaca caaagcaact tctgcttggg ctggaatatc
601 ttcacaacaa tgggatcatg catcgagata ttaaggggac aaatattttg gtcgataaca
661 aaggttgcat cagactcgca gattttggtg cttccaagaa agttgtagag ctagctactg
721 taaatggtgc caaatctatg aaggggacgc cttattggat ggctcctgaa gtcattctcc
781 agactggtca tagcttctct gctgatatat ggagtgttgg gtgcactgtg attgagatgc
841 ctacgggcaa gcctccctgg agcgagcagt atcagcagtt tgctgctgtc cttcatattg
901 gtagaacaaa agctcatcct ccaattccag aagacctctc accagaggct aaagactttc
961 taatgaaatg cttacacaaa gaaccaagct tgagactctc tgcaaccgaa ttgcttcagc
1021 acccgtttgt cact

NPK1

ccg ccaatccggt ggaggaaagc
301 tgaaatgatt ggatgtggtg cttttggtag ggtttatatg gggatgaatg ttgattctgc
361 agagttactc gctataaagg aggtttcgat tgcgatgaat ggtgcttcga gagagcgagc
421 acaagctcat gttagagagc ttgaggaaga agtgaatcta ttgaagaatc tctcccatcc
481 caacatagtg agatatttgg gaactgcaag agaggcagga tcattaaata tattgttgga
541 atttgttcct ggtggctcaa tctcgtcact tttgggaaaa tttggatcct tccctgaatc
601 tgttataaga atgtacacca agcaattgtt attagggttg gaatacttgc ataagaatgg
661 gattatgcac agagatatta agggagcaaa catacttgtt gacaataaag gttgcattaa
721 acttgctgat ttcggtgcat ccaagaaggt tgttgaattg gctactatga ctggtgccaa
781 gtcaatgaag ggtactccat actggatggc tcccgaagtc attctgcaga ctggccatag

FIGURE 16

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 841 cttctctgct gacatatgga gtgtcggatg cactattatc gaaatggcta caggaaaacc
 901 tccttggagc cagcagtatc aggaggttgc tgctctcttc catatagggа caaccaaatc
 961 ccatcccccc atcccagagc atctttctgc tgaatcaaag gacttcctat taaaatgttt
1021 gcagaaggaa ccgcacctga ggcattctgc atcaaatttg cttcagcatc catttgttac
1081 a
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